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ABSTRACT

This project studied pupil creativity in terms of the interdependence of the affective and cognitive domains. The relationships of the two facets were studied over the period of a full school year with 945 fifth grade pupils from a small urban district. Over the period of the study, growth was apparent in both domains. Parallel testings of the two domains correlated only slightly; this indicated independence. Most significantly, creative attitude served as a predictor of both attitude and ability while creative ability seemed only to predict itself. (Author)

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THE INTERDEPENDENCE OF CREATIVE ATTITUDE AND CREATIVE ABILITY

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This project studied pupil creativity in terms of the interdependence of the affective and cognitive domains. The relationships of the two facets were studied over the period of a full school year with 945 fifth grade pupils from a small urban district.

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PROBLEM

Emphasis on creativity as an operable facet of the intellect has accelerated over the past two decades. The major portion of the research on creativity has dealt with its identification and assessment as a cognitive variable. A few programs to effect changes in creativity have been initiated with varying degrees of success.

The central problem in the study of creativity is the lack of a universal definition of creativity. The lack of a universal definition has led to the assessment of creativity relative to the definition favored by the assessor. The resulting working definitions can be divided into four groups respectively based upon the creative product, the creative person, the creative environment and the creative process. The creative process group is the largest and, internally, most splintered.

In the creative process approach, creativity is studied as a problem-solving process distinct from convergent problem solving. The goal of this group is to ascertain what internal mechanisms act to cause a creative act and eventually to affect these mechanisms for greater creativity. The two major subgroups are the affective and the cognitive. The cognitive school views creativity as primarily an ability. The affective school views creativity as primarily an attitudinal phenomenon.

As Frierson (1969) has pointed out, the study of creativity has been greatly hampered by the multitude of definitions and criteria. A vast array of dichotomies exists, such as whether creativity is a single factor or multi-dimensional. When all of these positions are considered, agreement among studies is very seldom indeed.

Perhaps the most crucial of the dichotomies is that between cognitive and affective domains. The vast majority of the research has been in the cognitive domain (Roveton, 1970; Copley, 1967; Torrance, 1963). This approach states that creativity is within the cognitive domain and, thus, is approached as an ability. Cole (1969) summarized creativity as the intellectual behaviors. Olsen (1952) broke creativity into five major elements all of which were cognitive acts. This emphasis stems from Guilford's model of the intellect and his 1950 APA presidential speech where he said "in a narrow sense, creativity refers to the abilities that are most characteristic of creative people." However, as Feldman (1971) emphasized, the Guilford presidential address was limited in scope to scientific or inventive creativity. Rozik (1966) pointed out that as a result of Guilford's work, separating divergent and convergent thinking, most work has been done with divergent thinking rather than creativity itself. He further stated that identification of creativity will rely on certain identifying characteristics and attitudes. Even though he is the outstanding leader of the work of the cognitivists,

Torrance has stated that ability has the same relationship to creative achievement that IQ has to intellectual achievement (Torrance, 1968). One doesn't preclude the other but it increases the probability; however, at the same time it admits the existence of other correlates.

Of the possible correlates of creativity which could rival the cognitive domain, the affective domain seems to be gaining credence. Golann (1963) suggested that the preoccupation with cognitive approaches had a great deal to offer in the initial stages of research but now is inefficient. He further stated that we are now capable of utilizing personality and stylistic modes as criterion variables. He felt that, probably because of inherent difficulties, this approach has been neglected. As Covington (1968) defined, "we assume that it is the role of affective-type variables to structure, organize and sustain these intellectual operations[p.1]." Mattil (1953), working with 121 children ranging in age from 11- to 14-years, showed that adjustment and mental ability are directly related to creative products. Further, he concluded that the relationships between the three elements is such that a change in position of one would bring about a change in position of the others. It is regrettable that he used a rater scale to assess creativity rather than a more standardized measure. Garfield, Cohen and Roth (1969) found a positive relationship between mental health and creativity. However, while they did use a standardized measure, their sample was composed of 47 male students aged 18 to 24 who were classified as "bad" students. Treffinger and Ripple (1968) studied several approaches to training creative ability with elementary pupils. They found no significant effect on pupil creative ability; however, as a secondary hypothesis,

they investigated pupil attitudes and found a significant increase of pupil creative attitude. They conjectured that a positive influence on pupils' attitude "may be an important prerequisite" for developing pupil ability. In this writer's opinion, the fact that the affective domain was not a major facet of the study and the weakness of the attitude measure indicate the need for further research. Shively, Feldhusen, Treffinger and Asher (1971) studied the effects of creativity training programs on pupils and teacher influence on pupil creativity in 20 classes of 5th graders. One of their findings was that the existence of significant effects on an attitude measure in a basically cognitive study suggests the need for thorough assessment of the effects of such training programs on affective characteristics.

Williams (1965) stated that there are some very well-defined motivational characteristics of creativity. He listed autonomy, persistency, liking to think and to toy with ideas, desire for variety, preference for complexity and tolerance of ambiguity. He concluded that the creative personality is perceptually open. In reviewing past research, including the well-known 1965 Wallach and Kogan study, Parnes (1967) pointed out that subjects often have a disinclination rather than inability to be creative. He felt that the research indicated that individuals were defensively blocking the impulse to creativity. Williams (1969) said, "I would argue very strongly that a combination of both domains, cognitive and affective, is what makes for effective human development and the fully functioning, creative individual[p.9]." (This was after he reviewed work on the two domains as taxonomical models.) He went on to state that so-called creativity tests tend to be scored solely

on four divergent production factors which are cognitive. "There are no direct measures of affective processes derived from current, creative thinking tests which have been used predominately by researchers and teachers to assess children's creative potential[p.10]."

Guilford (1950) stated that the creative personality is of prime interest. This personality is a unique pattern of traits which are manifested by aptitude and attitude. Stein (1965) said that the entire area of personality as it affects divergent thinking abilities is fertile ground for investigation. Eisenmann (1968) studying 40 college students found that creative, complex subjects were moved attitudinally while the simple, noncreative were not. Ward (1968) studied the ideational fluency of 34 seven- and eight-year old boys. The finding that creative children (those having high response fluency) did not differ from uncreative children suggested to Ward that the difference is solely in personality and motivation rather than ability.

McGuire (1968) found in his studies that "all aspects of intelligent behavior--especially creativity or talented behavior--appear to be influenced in unexpected ways by the dynamic elements of our personality makeup which shape our values and attitudes[p.182]." Sanders (1960), discussing the makeup of the creative person noted that creativity in any field requires certain skills but that it also requires a certain temperament and personality.

Taylor (1961) emphasized that intelligence accounts for only a minor portion of variation in creative performance. The facts to be studied are both high level aptitude and motivational in nature. Rogers (1962) stated that the creative person is a fully functioning person

Shulman (1966) studying the effects of perceptual openness, with 89 grade 4 pupils found results that suggested that creativity presupposes openness in perception. Even though he was using a cognitive measure of creativity (the Drawing Completion Task), he came to see that the attitude of openness toward what is perceived is the crucial point. MacKinnon (1966) studied 600 adults and concluded that intelligence is not an index of creativity. Rather, he felt that it was inner control mechanisms, such as openness to experience, which count the most. Dellas (1971) trained 7th graders to associate emotional and visual events. She found that the emotional elements had a significant effect and concluded, "The affective domain, therefore, . . . emotions . . ., appears to be significant in the creative function[p.14]." She particularly noted that the defensiveness had a depressing effect. It should be noted that her creativity measure was cognitive in nature and so creative function as she uses it refers to creative ability.

Method

The sample was comprised of all the 5th grade pupils (N = 945) of an urban school district in Pennsylvania. The school district could be described as a small city district with predominately lower socio-economic residents. All of the pupils were tested in the Fall and again in the Spring. The affective facet of creativity was assessed using the Pennsylvania Assessment of Creative Tendency (Rookey, 1971a). The cognitive facet of creativity was assessed using the Fanani Hidden Figures Test (Fanani, 1964; Rookey, 1971b).

RESULTS

The means and standard deviations for the pupil measures are given in Table . It can be seen from Table that there was a gain on both measures over the school year. A z-test was computed between pretest and posttest for each measure and both resulting coefficients were significant beyond the .01 level.

Table

Means and Standard Deviations of Pupil Tests

	Mean	Standard Deviations
Hidden Figures Pretest	7.7579	1.9716
Hidden Figures Posttest	9.7098	1.9029
Hidden Figures Gain	2.0006	1.4809
PACT Pretest	129.6970	5.3061
PACT Posttest	134.6614	7.8343
PACT Gain	4.0844	6.1893

The means for the pupil measures by group and test are given in Table . It can be seen that the experimental group had a slightly higher pretest on PACT than the control group. The significance of this difference was tested using this formula:

$$z = \frac{M_1 - M_2}{\sqrt{\frac{S_1^2}{n_1 - 1} + \frac{S_2^2}{n_2 - 1}}}$$

The z score for this difference was 0.8448 which was not significant beyond the .05 level. The control group had a slightly higher pretest on the Fanani Hidden Figures Test than the experimental group. The significance of this difference was tested using the z score. The z score for this difference was 1.2676 which was not significant beyond the .05 level. The two groups were about equal on the posttests of both measures.

Table

Mean Scores and Standard Deviations on Pupil Measures for Experimental and Control Groups

	Experimental		Control	
	Mean	Standard Deviation	Mean	Standard Deviation
PACT Pretest	130.2167	4.3589	128.7199	6.2915
PACT Posttest	134.6371	5.9576	134.6859	9.5743
Fanani Pretest	7.3616	2.3511	8.1675	1.3582
Fanani Posttest	9.5012	2.1344	9.9253	1.5534

An analysis of covariance was run on the PACT data to see if the experimental group was significantly different from the control group as a result of the treatment. The pretest was used as the covariate and the posttest served as the dependent variable. The results of this analysis are displayed in Table . The experimental group was not significantly different from the control group.

Table

Analysis of Covariance on PACT
Between Experimental and Control Groups

Source	Degrees of Freedom	Adjusted Sum of Squares	Mean Square	F
Treatment	1	103.5625	103.5625	0.3049
Error	762	258857.8100	339.7083	
Total	763	258961.3700		

An analysis of covariance was computed on the Fanani Hidden Figures Test data to see if the experimental group was significantly different from the control group as a result of the treatment. The pretest served as the covariate and the posttest was used as the dependent variable. The results of this analysis are shown in Table . The experimental group was not significantly different from the control group at the .05 level.

Table

Analysis of Covariance on Fanani Hidden
Figures Test Between Experimental and Control Groups

Source	Degrees of Freedom	Adjusted Sum of Squares	Mean Square	F
Treatment	1	0.1133	0.1133	0.0057
Error	786	15640.3550	19.8987	
Total	787	15640.4860		

The F ratio reported in Table 5 was so low that a consideration was made that it would be significant at the .95 level. This was tested using the formula: $.95\ F_{ij} = \frac{1}{.05\ F_{ji}}$. The resulting F was 0.0039. Since the F in Table 5 was not equal to, or less than 0.0039, it was not significant beyond the .95 level.

To further assess the pupil data, a Pearson Product Moment Correlation matrix was computed using the pupil scores on the Pennsylvania Assessment of Creative Tendency, and the Fanani Hidden Figures Test (Form B.) There were four significant correlations as shown in Table

Table

Pearson Product Moment
Correlation Matrix of Pupil Measures

	PACT		Fanani	
	Pretest	Posttest	Pretest	Posttest
PACT Pretest	1.0000			
PACT Posttest	**0.4724	1.0000		
Fanani Pretest	0.1409	0.0812	1.0000	
Fanani Posttest	*0.2275	*0.1965	**0.4882	1.0000

* $.05\ r\ 100 \geq 0.1654$

** $.01\ r\ 100 \geq 0.2324$

Continued

The pretest and posttest scores on the Pennsylvania Assessment of Creative Tendency intercorrelated significantly beyond the .01 level.

The pretest and posttest scores on the Fanani Hidden Figures Test (Form B) also intercorrelated significantly beyond the .01 level. The pretest to posttest relationships are about the same for both instruments.

The posttests of the Fanani Hidden Figures Test and the Pennsylvania Assessment of Creative Tendency correlated significantly beyond the .05 level. The pretest of the Pennsylvania Assessment of Creative Tendency correlated significantly beyond the .05 level with the posttest of the Fanani Hidden Figures Test; however, the pretest of the Fanani Hidden Figures Test did not correlate significantly with the posttest of the Pennsylvania Assessment of Creative Tendency, nor were the pretests of the two measures significantly related. This suggests that creative attitude is a predictor of creative ability and creative attitude, while creative ability is a predictor of creative ability alone and not creative attitude.

DISCUSSION AND CONCLUSIONS

Over the period of the study, the pupil mean scores increased in both creative ability and creative attitude. Thus, growth was not confined to either domain. This supports Mattil's (1953) conclusion that growth in the one domain is accompanied by growth in the other domain. It also supports Eisenmann's (1968) finding that creative movement is associated with attitudinal as well as cognitive factors.

The low correlations of the affective and cognitive measures of creativity (pre to pre, post to post and gain to gain) indicate that the measures are independent of each other but not totally so. This would suggest that both domains are necessary to describe pupil creativity which was the position taken by Williams (1969) and Sanders (1960). It also supports Torrance (1968) and Taylor (1961) when they state that cognitive assessment is not sufficient to describe creativity. And, while this finding supports Stein's (1965) statement that the affective domain is fertile ground for creativity research, it repudiates Ward's (1968) finding that differences are solely in terms of personality.

Perhaps the most important finding was that the creative attitude pretest correlated significantly with the posttests of both creative attitude and creative ability while the creative ability pretest correlated significantly with only the creative ability posttest. This seemed to indicate that creative attitude predicts both creative ability and creative attitude while, creative ability predicts only creative ability. This finding repudiates the emphasis on the cognitive domain

inherent in such studies as Cole's (1969). Studies such as Shively, Feldhusen, Treffinger, and Asher (1971); Dellas (1971); and McQuire (1969) which found that assessment of the affective domain was as important or more important than assessment of the cognitive domain were supported. Covington's (1968) definition of the affective domain as organizing and sustaining the cognitive was supported. The proposals of Treffinger and Ripple (1968), Rosik (1966), and McKinnon (1966) that influencing the affective domain is a prerequisite were supported.

The implications of these findings are important in both instruction and assessment. Instructional programs which are designed with pupil creativity as a goal cannot be unidimensional. The program must prepare the pupil affectively as well as cognitively. If the cognitive domain alone is addressed, there is no reason to expect creative production to occur. The affective component serves as a regulatory connection between the ability and product. Likewise, it is unreasonable to address solely the affective domain. If the affective domain is not accompanied by the cognitive, the pupil would desire to produce but not be equipped to produce.

The assessment of creativity must take into account the existence of both domains. It would seem logical that the assessment of one domain would be fairly useless without the corresponding domain. Since the end product would be an assessment of the overall context of creativity, the use of only one domain would serve as an obstructor not a clarifier. The single domain assessment would indicate a situation that only existed when the second domain was not functioning. The use of both domains in assessment would yield a measure of creativity which would account for the functioning of both domains. Creativity would thus be a combination of the ability to act and the desire to act.